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ISSUED AS PRELIM CIU-7
MANUAL

MP MASTER
MA24026

INSTRUCTION MANUAL
FOR
INPUT UNIT
MODEL IU-7A
(For Use With Series VII EMI/FI Meters)

MANUAL NO. 1-500783-283 (REV. A)

(For Use With Serial Numbers 101 and Above)

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The Singer Company, Los Angeles Operation • 5340 Alla Road, Los Angeles, Ca. 90066

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1. Model or Type
2. Serial Number
3. Description of trouble(1)
4. Approximate date instrument was placed in operation.
5. Approximate number of hours in use.
6. Has maintenance action been previously requested.
7. Other comments.

(1) Include data on symptoms, measurements taken, suspected location of trouble, maintenance action taken and any other relevant data.

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Figure 1-1. Input Unit, Model IU-7A

Section I

INTRODUCTION

1.1 SCOPE OF MANUAL

This manual provides operating and maintenance information for the Model IU-7A Input Unit. (See Figure 1-1.)

1.2 GENERAL DESCRIPTION

The Model IU-7A Input Unit performs two basic operations. It connects the proper antenna or current probe to the selected EMI/FI Meter and inserts an RF attenuator between the selected EMI/FI Meter and the selected antenna or current probe. Both operations are controlled by the Model P-7 Programmer. The Model IU-7A also controls the antenna band selection of programmable antennas used with the Model NM-17/27 EMI/FI Meter.

1.3 SUPPLIED ACCESSORIES

The items listed in Table 1-1 are furnished with the Model IU-7A Input Unit.

Table 1-1. Supplied Accessories

Quantity	Device	Singer Part/Model No.
1	AC Power Cable, 7 1/2 ft	1-910166-001
1	Control Cable, 19 Conductor, 20 ft	94604-2
1	Instruction Manual	1-500783-283
2	Rack Mounting Brackets	2-103856-001
4	Flat-head Screws, 8-32 x 3/8"	1-964064-043

1.4 OPTIONAL ACCESSORIES

Accessories available for use with the Model IU-7A are listed below.

a. Loop Antenna, Model 94605-1, 5 1/4 in. diameter. Used for measuring magnetic field strength within the range of 10 Hz to 250 kHz.

b. Loop Antenna, Model 94608-1, 30 in. diameter. Used for measuring magnetic field strength within the range of 10 Hz to 250 kHz.

c. Programmable Rod Antenna Coupler, Model 94592-1. Used with Rod Antenna (d) for measuring electric field strength within the range of 10 kHz to 32 MHz.

d. Rod Antenna, 41 in, Model 92197-3. Use with Rod Antenna Coupler (c) for measuring electric field strength within the range of 10 kHz to 32 MHz.

e. Programmable Loop Antenna/Coupler, Model 94593-1. Used for measuring magnetic field strength within the range of 10 kHz to 32 MHz.

f. Biconical Antenna, Model 94455-1. Used for measuring electrical field strength within the range of 25 MHz to 200 MHz.

g. Log Spiral Antenna, Model 93490-1. Used for measuring electric field strength within the range of 200 MHz to 1 GHz.

h. RF Current Probe, Model 91197-1. Used for measuring RF currents. Has a maximum transfer impedance of 0.33 ohms that is substantially constant from 5 kHz to 2 MHz.

i. RF Current Probe, Model 91550-1. Used for measuring RF currents. Has a maximum transfer impedance of 5.5 ohms that provides the best sensitivity from 50 kHz to 100 MHz.

j. RF Current Probe, Model 94111-1. Used for measuring RF currents. Has a transfer impedance that varies from 1 ohm to 10 ohms over the frequency range of 30 MHz to 1 GHz.

k. Antenna Control Cable, Model 94594-1 (41 conductors). Connects the Rod Antenna Coupler (c) or the Loop Antenna (e) to the Model IU-7A for automatic remote band switching of the antennas at a distance of up to 20 feet.

l. RF Transmission Line, Model 90933-8 (Type N connectors). Used for connecting the EMI/FI Meter Model NM-37/57 to the Model IU-7A, for connecting the Current Probe Model 94111(j) to the Model IU-7A, or for connecting the Antenna Model 93490-1 (g) or Antenna Model 94455-1 (f) to the Model IU-7A within a distance of 20 feet.

m. RF Transmission Line, Model 92191-1 (Type BNC connectors). Used for connecting the EMI/FI Meter Model NM-7 or NM-17/27 to the Model IU-7A, for connecting the Current Probes Models 91197-1 (h) or 91550-1 (i) to the Model IU-7A, or for connecting the Antennas Models 94605-1 (a), 94608-1 (b), 94592-1 (c) or 94593-1 (e) to the Model IU-7A within a distance of 20 feet.

Section II

SPECIFICATIONS

2.1 INTRODUCTION

This section contains specification information for the Model IU-7A.

2.2 SPECIFICATIONS

Table 2-1 contains the specification data for the Model IU-7A Input Unit.

Table 2-1. Specifications

Characteristics		Specifications
Four coaxial inputs:	BNC: N:	20 Hz to 50 kHz, 10 kHz to 32 MHz, 30 MHz to 192 MHz, 186 MHz to 1 GHz
Three coaxial outputs:	BNC: N:	Model NM-7, Model NM-17/27, Model NM-37/57
Frequency Range:		20 Hz to 1 GHz
Attenuation:		0 dB to 100 dB in 20 dB steps
Attenuation Accuracy:		±1.5 dB
Power Required:		105 V to 130 V or 210 V to 260 V, 50 Hz to 400 Hz, 40 watts maximum
Mechanical: Dimensions (including knobs and receptacles without rack mounting brackets)		Approx. Height: 14.0 cm (5.5") Approx. Width: 43.2 cm (17.0") Approx. Depth: 30.5 cm (12.0")
Weight:		Approx. 8.2 kg (18 lb)
Environmental: Temperature:		Operational: -15°C to +50°C (+5°F to +123°F) Non-operational: -50°C to +75°C (-58°F to +167°F)

Table 2-1. Specifications (Cont.)

Characteristics	Specifications
Vibration:	Meets MIL-T-21200, Class 3 non-operating
Altitude:	Operational to at least 4570 m (15000 ft) mean sea level

Section III

CONTROLS, INDICATORS AND RECEPTACLES

3.1 INTRODUCTION

This section contains functional descriptions of the controls, indicators and receptacles for the Model IU-7A Input Unit.

3.2 OPERATING CONTROLS, INDICATORS AND RECEPTACLES

All external operating controls, indicators and receptacles of the Model IU-7A Input Unit are located on the front panel as indicated by Figure 3-1. Functions are described in Table 3-1 and items are located in Figure 3-1.

Table 3-1. Controls, Indicators and Receptacles

Item	Panel Marking	Description	Function
1	ANTENNAS/CURRENT PROBES 20 Hz - 50 kHz	BNC Receptacle (J1)	Provides input for either Model 94605-1 or Model 94608-1 Antennas, or Model 91197-1 RF Current Probe
2	ANTENNAS/CURRENT PROBES 0.01 - 32 MHz	BNC Receptacle (J2)	Provides input for either Model 94592-1/92197-3 or Model 94593-1 Antennas or Model 91550-1 RF Current Probe
3	EMI METERS NM-7	BNC Receptacle (J5)	Provides the means for connecting the Model NM-7 EMI/FI Meter to the Model IU-7A

Table 3-1. Controls, Indicators and Receptacles (Cont.)

Item	Panel Marking	Description	Function
4	ON OFF	Two position toggle switch (S1)	Provides the means for energizing the Model IU-7A when item 9 is connected to a power source.
5		Red indicator lamp (DS1)	Indicates when Model IU-7A is energized
6	0.25A 0.5A	Fuse holder (XF2)	Fuse holder for ac fuse. Use 0.5 A for use with 115 Vac and 0.25 A for use with 230 Vac
7	0.25A 0.5A	Fuse holder (XF1)	Fuse holder for ac fuse. Use 0.5 A for use with 115 Vac and 0.25 A for use with 230 Vac
8	230 V 115 V	Two position slide switch (S2)	Provides the means for interconnecting the power supply input circuitry for use with 115 Vac or 230 Vac power sources
9	115/230 VRMS 50-400 Hz	Three pin ac power receptacle (J10)	Provides the means for connecting the Model IU-7A to either a 115 Vac or 220 Vac power source.
10	P7 PROGRAMMER	19 pin receptacle (J9)	Provides the means for connecting the Model IU-7A to the Model P-7 Programmer. For pin data refer to Table 3-2.
11	NM-17/27 PROGRAMMABLE ANTENNA	41 pin receptacle (J8)	Provides the means for connecting the Model IU-7A to the programmable antennas available for the Model NM-17/27 EMI/FI Meter for automatic bandswitching operation. For pin data refer to Table 3-3.

Table 3-1. Controls, Indicators and Receptacles (Cont.)

Item	Panel Marking	Description	Function
12	EMI METERS NM-17/27	BNC receptacle (J6)	Provides the means for connecting the Model NM-17/27 EMI/FI Meter to the Model IU-7A.
13	EMI METERS NM-37/57	Type N receptacle (J7)	Provides the means for connecting the Model NM-37/57 EMI/FI Meter to the Model IU-7A
14	RADIATED CONDUCTED	Two position toggle switch (S3)	When in the RADIATED position, Items 15 and 16 are connected into the circuitry for use with antennas. When in the CONDUCTED position, only Item 15 is connected into the circuit for use with RF Current Probe Model 94111-1
15	ANTENNAS/ CURRENT PROBES 186 - 1000 MHz 30 - 1000 MHz	Type N receptacle (J4)	Provides the means for connecting either the Model 93490-1 Antenna or the Model 94111-1 RF Current Probe to the Model IU-7A
16	ANTENNAS/ CURRENT PROBES 30 - 192 MHz	Type N receptacle (J3)	Provides the means for connecting the Model 94455-1 Antenna to the Model IU-7A.

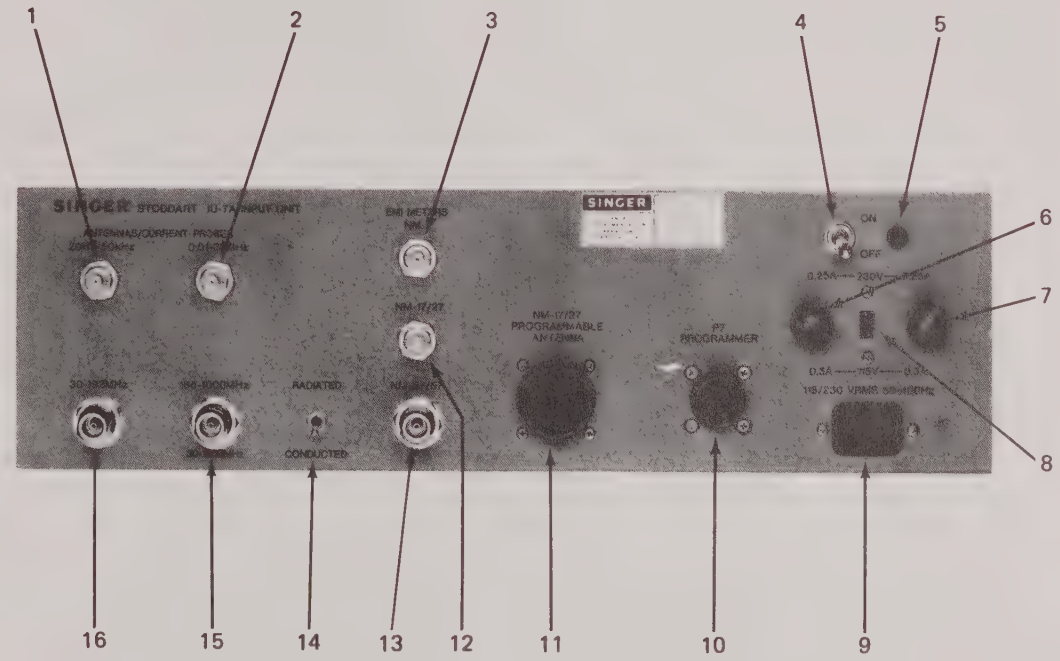


Figure 3-1. Controls, Indicators and Receptacles, Model IU-7A

Table 3-2. P-7 PROGRAMMER Receptacle Pin Data (J9)

Pin	Function
A	BCD input (2^0) to select proper remote antenna for the EMI/FI Meter selected. Format defined in Table 3-4.
B	BCD input (2^1) to select proper remote antenna for the EMI/FI Meter selected. Format Defined in Table 3-4.
C	BCD input (2^2) to select proper remote antenna for the EMI/FI Meter selected. Format defined in Table 3-4.
D	BCD input (2^3) to select proper remote antenna for the EMI/FI Meter selected. Format defined in Table 3-4.
E	BCD input (2^4) to select proper remote antenna for the EMI/FI Meter selected. Format defined in Table 3-4.
F	Not used.
G	Ground used for interlock between the Model IU-7A and the Model DDU-7.
H	0 V input selects the 20 dB position of the remote attenuator. Otherwise +5 V appears at this pin.
J	0 V input selects the 40 dB position of the remote attenuator. Otherwise +5 V appears at this pin.
K	0 V input selects the 60 dB position of the remote attenuator. Otherwise +5 V appears at this pin.
L	0 V input selects the 80 dB position of the remote attenuator. Otherwise +5 V appears at this pin.
M	0 V input selects the 100 dB position of the remote attenuator. Otherwise +5 V appears at this pin.
N	Not used.
P	Not used.
R	Not used.
S	Not used.

Table 3-2. P-7 PROGRAMMER Receptacle Pin Data (J9) (Cont.)

Pin	Function
T	-15 V power supply input for assembly, A4.
U	Not used.
V	Provides dc ground between Model P-7 and the Model IU-7A.

Table 3-3. NM-17/27 PROGRAMMABLE ANTENNA Receptacle Pin Data (J8)

Pin	Function
A	-15 V output to select band 1 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
B	-15 V output to select band 2 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
C	-15 V output to select band 3 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
D	-15 V output to select band 4 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
E	-15 V output to select band 5 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
F	-15 V output to select band 6 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
G	Not used.
H	-15 V output to select band 7 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
J	Not used.
K	-15 V output to select band 8 of the remote programmable antenna used with the Model NM-17/27 EMI/FI Meter.
L thru T	Not used.

Table 3-3. NM-17/27 PROGRAMMABLE ANTENNA Receptacle Pin Data (J8) (Cont.)

Pin	Function
U	Provides dc ground between Model IU-7A and programmable antennas.
V thru t	Not used.

Table 3-4. BCD Output Format

EMI/FI Meter	2^4	2^3	2^2	2^1	2^0
NM-7	0	0	0	0	0
NM-17/27	0	0	0	0	1
	0	0	0	1	0
	0	0	0	1	1
	0	0	1	0	0
	0	0	1	0	1
	0	0	1	1	0
	0	0	1	1	1
	0	1	0	0	0
NM-37/57	0	1	0	0	1
	0	1	0	1	0
	0	1	0	1	1
	0	1	1	0	0
	0	1	1	0	1
	0	1	1	1	0
	0	1	1	1	1
	1	0	0	0	0

NOTE:

J9-A = 2^0
J9-B = 2^1
J9-C = 2^2
J9-D = 2^3
J9-E = 2^4

Section IV

INSTALLATION

4.1 INTRODUCTION

This section contains information on bench operation versus rack mounting and 115 V versus 230 V operation.

4.2 BENCH OPERATION

The Model IU-7A is shipped ready for use as a bench-operated instrument.

4.3 RACK MOUNTING

A set of adapter brackets and attaching screws are provided to permit mounting of the Model IU-7A into a standard 19-inch rack. To prepare the instrument for rack mounting, proceed as follows:

a. Remove the four screws that attach the four feet to the bottom of the instrument. Retain the screws and feet for future use.

b. Attach one rack mounting bracket (Part No. 2-103856-001) to each side of the instrument using two 8-32 x 3/8" screws (Part No. 1-964064-043) in each bracket.

NOTE

For convenience the instrument may be rack-mounted so that the "front panel" is oriented at either the front or the rear of the rack.

4.4 115 V VERSUS 230 V OPERATION

The Model IU-7A requires ac power of 105 to 130 volts, or 210 to 260 volts, 50 to 400 Hz, approximately 40 watts.

a. Set the 115/230 V slide switch on the front panel to the position corresponding to the ac power line voltage. For 115 V operation, use two 0.5 A fuses; for 230 V operation, use two 0.25 A fuses.

> WARNING
> The Model IU-7A is designed for operation from a polarized, three-terminal power receptacle having one terminal connected to earth ground. When only a two-terminal receptacle is available, to eliminate shock hazard, use a three-prong to two-prong adapter and connect the adapter pigtail lead to the power receptacle ground.

b. Connect the female end of the 7 1/2-foot power cable to the ac power receptacle on the rear panel of the instrument. Connect the male end of the cable to the ac power source.

c. Set the ON-OFF switch on the front panel to the ON position.

4.5 TYPICAL INSTRUMENT SET-UP

4.5.1 Radiated Measurements

a. Set up equipment as in Figure 4-1.

b. Set CONDUCTED-RADIATED switch to the RADIATED position.

4.5.2 Conducted Measurements

a. Set up equipment as in Figure 4-2.

b. Set CONDUCTED-RADIATED switch to the CONDUCTED position.

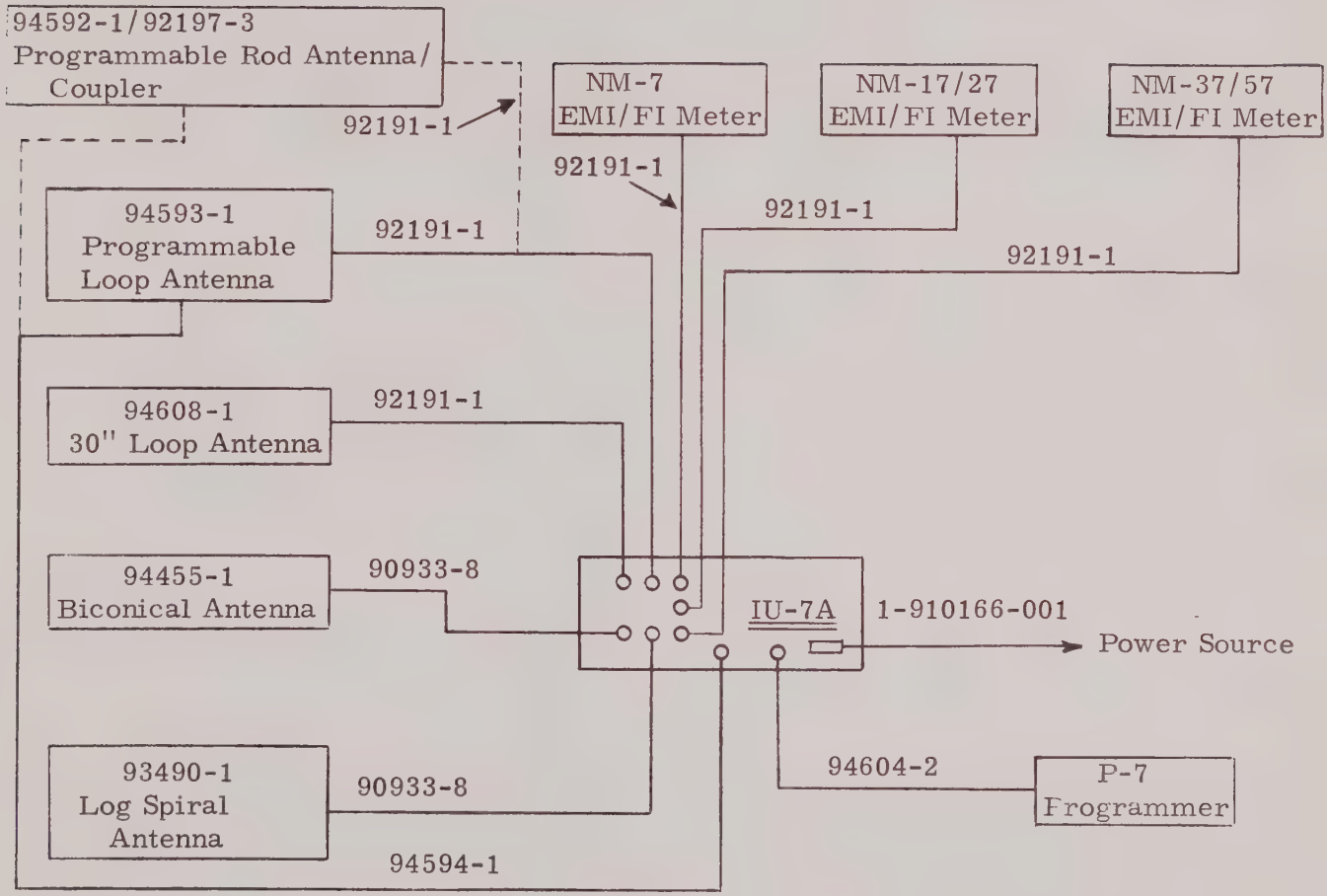


Figure 4-1. Typical Set-up for Radiated Measurements

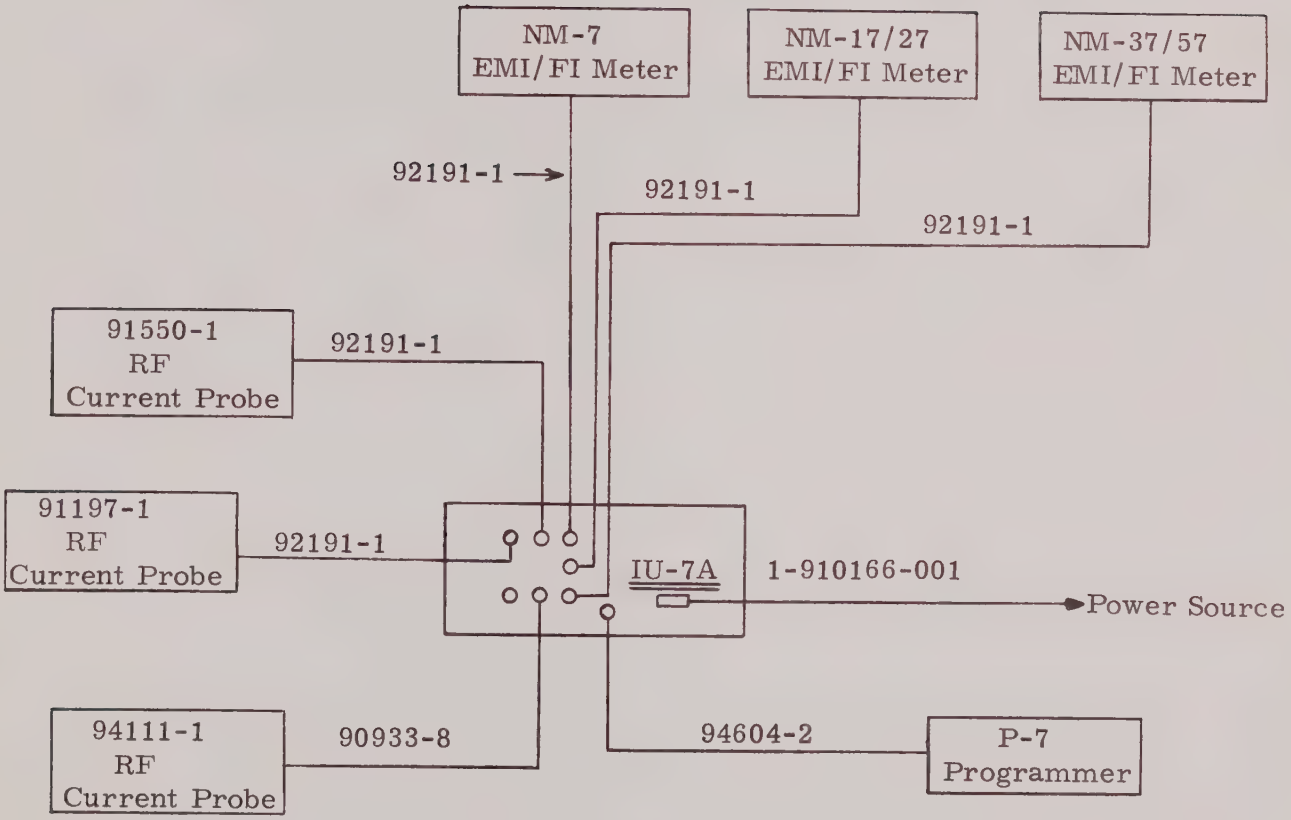


Figure 4-2. Typical Set-up for Conducted Measurements

Section V

OPERATING INSTRUCTIONS

5.1 INTRODUCTION

Instructions for operating the Model IU-7A when connected to a Model P-7 Programmer are presented in this section of the manual. Sections III and IV explain the functions of the controls, indicators and receptacles, provide information for rack mounting and 115 V versus 230 V operation, and provide typical instrument interconnection diagrams.

5.2 RADIATED MEASUREMENTS

a. Set up the equipment as shown in Figure 4-1.

b. Set the RADIATED-CONDUCTED switch on the Model IU-7A to the RADIATED position.

c. Set the REMOTE ATTEN (dB) switch on the Model P-7 to the desired value of attenuation to be inserted between the antennas and the EMI/FI Meters.

d. Depress the Band Select switches on the Model P-7 to the desired bands.

e. The remainder of the operating procedures are included in the Model P-7 Instruction Manual.

5.3 CONDUCTED MEASUREMENTS

a. Set up the equipment as shown in Figure 4-2.

b. Set the RADIATED-CONDUCTED switch on the Model IU-7A to the CONDUCTED position.

c. Set the REMOTE ATTEN (dB) switch on the Model P-7 to the desired value of attenuation to be inserted between the current probes and the EMI/FI Meters.

d. Depress the Band Select switches on the Model P-7 to the desired bands.

e. The remainder of the operating procedures are included in the Model P-7 Instruction Manual.

Section VI

THEORY OF OPERATION

6.1 INTRODUCTION

This section contains the theory of operation of the Model IU-7A Input Unit. The information is presented in two forms: a basic discussion of the simplified Block Diagram, Figure 6-1, and a detailed circuit analysis oriented to the Schematic Diagrams, Figures 9-1 thru 9-3. The Block Diagram discussion will aid the user in understanding the various controls of the instrument to obtain accurate measurements. The circuit analysis information is primarily for the benefit of the technician to troubleshoot and repair the equipment.

6.2 BASIC PRINCIPLES OF OPERATION

The Model IU-7A Input Unit performs two basic operations. It connects the proper antenna or current probe to the selected EMI/FI Meter and inserts an RF attenuator between the selected EMI/FI Meter and the selected antenna or current probe. The Model IU-7A also performs the antenna band selection of programmable antennas used with the Model NM-17/27 EMI/FI Meter. These operations are controlled by the Model P-7 Programmer.

6.3 DETAILED THEORY

The antennas or current probes and EMI/FI Meters are switched by 1P4T coaxial relays, A1 and A3. These shorting-type coaxial relays are operated

by 24 V solenoids, controlled by band decoder and relay driver circuits. The band command signals are supplied by the Model P-7 Programmer via Control Cable Model 94604-2, connected to the 19 pin P7 PROGRAMMER receptacle, J9. BCD signals with inverted logic are applied through Hex Inverter A4U1, and Quadruple NAND Gate A4U2, to two BCD-to-Decimal Decoders, A4U3 and A4U4. The decoders actuate the selected relay driver, A4Q1 thru A4Q11, according to the band command.

The relay drivers apply +24 V to the proper solenoids of the coaxial relays. A4Q1 connects the 20 Hz to 50 kHz antenna to EMI/FI Meter, Model NM-7. Relay drivers A4Q2 thru A4Q9 and inverters A4Q15 thru A4Q22 connect the 10 kHz to 30 MHz antenna to the Model NM-17/27 and yield -15 V command signals via the 41 pin PROGRAMMABLE ANTENNA receptacle, J8, and Antenna Control Cable Model 94594-1 to the programmable antenna used with the Model NM-17/27 EMI/FI Meter. Relay driver, A4Q10, connects the 30 MHz to 192 MHz antenna to EMI/FI Meter Model NM-37/57 and A4Q11 connects the 186 MHz to 1 GHz antenna to the Model NM-37/57.

When conducted interference is measured using current probes as signal pick-up devices, RF Current Probe Model 94111-1, which covers the entire frequency range of the Model NM-37/57 (30 MHz to 1 GHz) may be used. In this case the current probe should be connected to the 186 - 1000 MHz/30 - 1000 MHz receptacle and the CONDUCTED-RADIATED switch on the front panel of the Model IU-7A should be set to the CONDUCTED position. The function of the RADIATED-

CONDUCTED switch is to maintain an active signal path through the 186 - 1000 MHz/30 - 1000 MHz receptacle for bands 4 through 8 of the NM-37/57 in RADIATED position and for bands 1 through 8 in the CONDUCTED position.

The attenuator command signals are supplied by the Model P-7 Programmer via Control Cable Model 94604-2 connected to the 19 pin P7 PROGRAMMER receptacle, J9. The command signals are applied through Hex Buffer/Driver A4U5 to relay drivers A4Q12, A4Q13 and A4Q14. The Programmable Attenuator, A2, contains 10 dB, 20 dB, 30 dB and 60 dB sections, each controlled by separate 24 V solenoids. A4Q12 activates the solenoid of the 20 dB attenuator, A4Q13 activates the solenoids of the 10 dB and 30 dB attenuators, A4Q14 activates the solenoid of the 60 dB attenuator. For 80 dB of attenuation A4Q12 and A4Q14 are actuated via A4CR12 and A4CR14 logic diodes. For 100 dB of attenuation A4Q13 and A4Q14 are activated via A4CR13 and A4CR15.

The coaxial relays and the programmable attenuator are operated by +24 V control lines. The logic circuits of the band decoder and attenuator buffer operate from +5 V. A +24 V 30 W regulated power supply, A6, provides +24 V for the relay drivers. A 5 V regulator A5U1 is used to provide +5 V to the logic circuits. To protect the regulator against overload, a 50 ohm 10 W resistor, R1, is inserted between the +24 V line and +5 V regulator. The Model P-7 Programmer provides -15 V, required to operate the Programmable Antennas.

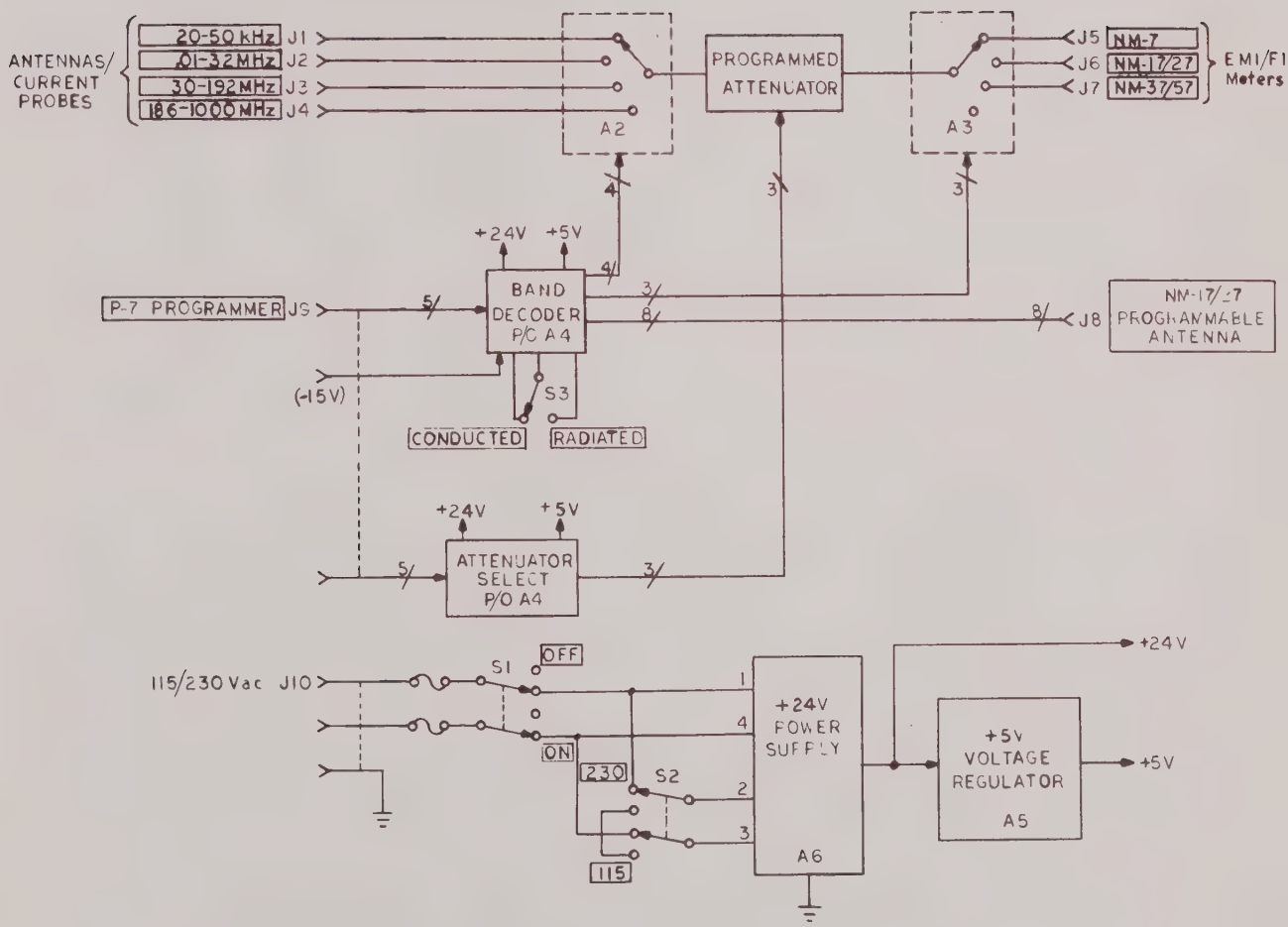


Figure 6-1

Block Diagram, Model IU-7

Section VII

MAINTENANCE

7.1 INTRODUCTION

This section of the manual contains minimum performance procedures, disassembly procedures, alignment procedures, and fault isolation procedures for the Model IU-7A. The minimum performance test procedures are intended to verify that the Model IU-7A is functioning in accordance with the specification requirements listed in Section II. Disassembly procedures are presented as necessary for ordinary maintenance requirements.

No scheduled, periodic maintenance of the Model IU-7A is required. The minimum performance test procedures should be used to establish the operational performance capability of the instrument, and the fault isolation procedure should be used to assist in isolating a possible malfunction to a specific section. Use normal troubleshooting techniques to further isolate the fault to the component level. Replace the faulty component, then test and realign the unit as necessary.

7.2 MINIMUM PERFORMANCE TEST PROCEDURES

The test procedures contained in this section may be used to establish the performance of the Model IU-7A within acceptacle limits.

7.2.1 Test Equipment Required

Table 7-1 lists the test equipment minimum parameters and recommended

models that are required for conducting the minimum performance test of the Model IU-7A.

Table 7-1. Test Equipment Requirements

Instrument	Minimum Parameters	Recommended Model
Signal Generator	Frequency: 100 kHz level: 1 Vrms	Hewlett-Packard Model 606
RF Voltmeter	Frequency: 100 kHz level: 10 μV to 1 V accuracy: ±0.15 dB	Singer Model NM-12T
DC Voltmeter	level: 24 V accuracy: ±0.01 V	Dana Model 4700A
Clip-on dc Milliameter	range: 220 mA to 1 Amp	Hewlett-Packard Model 428B
AC Power Meter	Measurement range : 40 W	General Radio Model 1840-A
DC Power Supply	Output level: 15 V at 25 mA	Hewlett-Packard Model 721

7.2.2 Evaluation of Remote Attenuator

a. Conneet the signal generator to the 20 Hz - 50 kHz ANTENNA receptacle and the RF voltmeter to the NM-7 RECEIVER receptacle.

b. Set the signal generator frequency to 100 kHz at a level of 1 V as noted on the RF voltmeter.

c. Ground J9-H and note the RF voltmeter indication. The RF voltmeter should indicate 100 mV ±1.5 dB (84 mV to 120 mV rms).

d. Repeat Step c according to Table 7-2.

Table 7-2. Attenuator Test Voltmeter Indications

Grounded Terminal	RF Voltmeter Indication
J9-J	10 mV ±1.5 dB (8.4 mV to 12.0 mV)
J9-K	1 mV ±1.5 dB (0.84 mV to 1.2 mV)
J9-L	100 μV ±1.5 dB (84 μV to 120 μV)
J9-M	10 μV ±1.5 dB (8.4 μV to 12.0 μV)

7.2.3 Evaluation of Antenna Selection

a. Connect the signal generator to the 20 Hz - 50 kHz ANTENNA receptacle and the RF voltmeter to the NM-7 RECEIVER receptacle. Apply -15 Vdc to J9-T; ground to J9-V.

b. Set the signal generator frequency to 100 kHz and the level to 1 V rms as noted on the RF voltmeter.

c. Reconnect the signal generator to the 0.01-32 MHz ANTENNA receptacle and the RF voltmeter to the NM-17/27 RECEIVER receptacle.

d. Ground terminal J9-A and note the RF voltmeter indication. The RF voltmeter should indicate 1 V rms.

e. Check for approximately -15 V at J8-A.

f. Repeat Steps d and e as in Table 7-3.

Table 7-3. Model NM-17/27 Antenna Selection Information

Ground Terminals	Note -15 V at:
J9-B	J8-B
J9-A, B	J8-C
J9-C	J8-D
J9-A, C	J8-E
J9-B, C	J8-F
J9-A, B, C	J8-H
J9-D	J8-K

g. Connect the signal generator to the 30-192 MHz ANTENNA receptacle and the RF voltmeter to the NM-37/57 RECEIVER receptacle.

h. Set the CONDUCTED-RADIATED switch to the RADIATED position.

i. Ground terminals J9-A and D and note the RF voltmeter indication. The RF voltmeter should indicate 1 V rms.

j. Repeat Step i by grounding sequentially J9-B and D, and J9-A, B and D.

k. Set the CONDUCTED-RADIATED switch to the CONDUCTED position.

l. The RF voltmeter indication should indicate zero.

m. Connect the signal generator to the 186-1000 MHz ANTENNA receptacle.

n. Repeat Step i by grounding sequentially J9-C, D; J9-A, C, D; J9-B, C, D; J9-A, B, C, D; and J9-E.

o. Set the CONDUCTED-RADIATED switch to the RADIATED position and repeat Step n.

7.3 ALIGNMENT AND ADJUSTMENT PROCEDURES

7.3.1 Disassembly Procedures

a. Remove the twelve 6-32 x 3/8" flat-head screws from the top cover.

b. Remove the top cover.

7.3.2 Power Supply Adjustment (Refer to Figure 7-1 for assembly locations.)

a. Set the 115-230 V slide switch to the 115 V position and supply 115 V 60 Hz to the ac power input. Set the power switch on and measure the dc level at the +terminal of the power supply assembly, A6. Adjust the potentiometer on the power supply assembly, if necessary, for +24 V ±0.1 V (+23.9 V to +24.1 V).

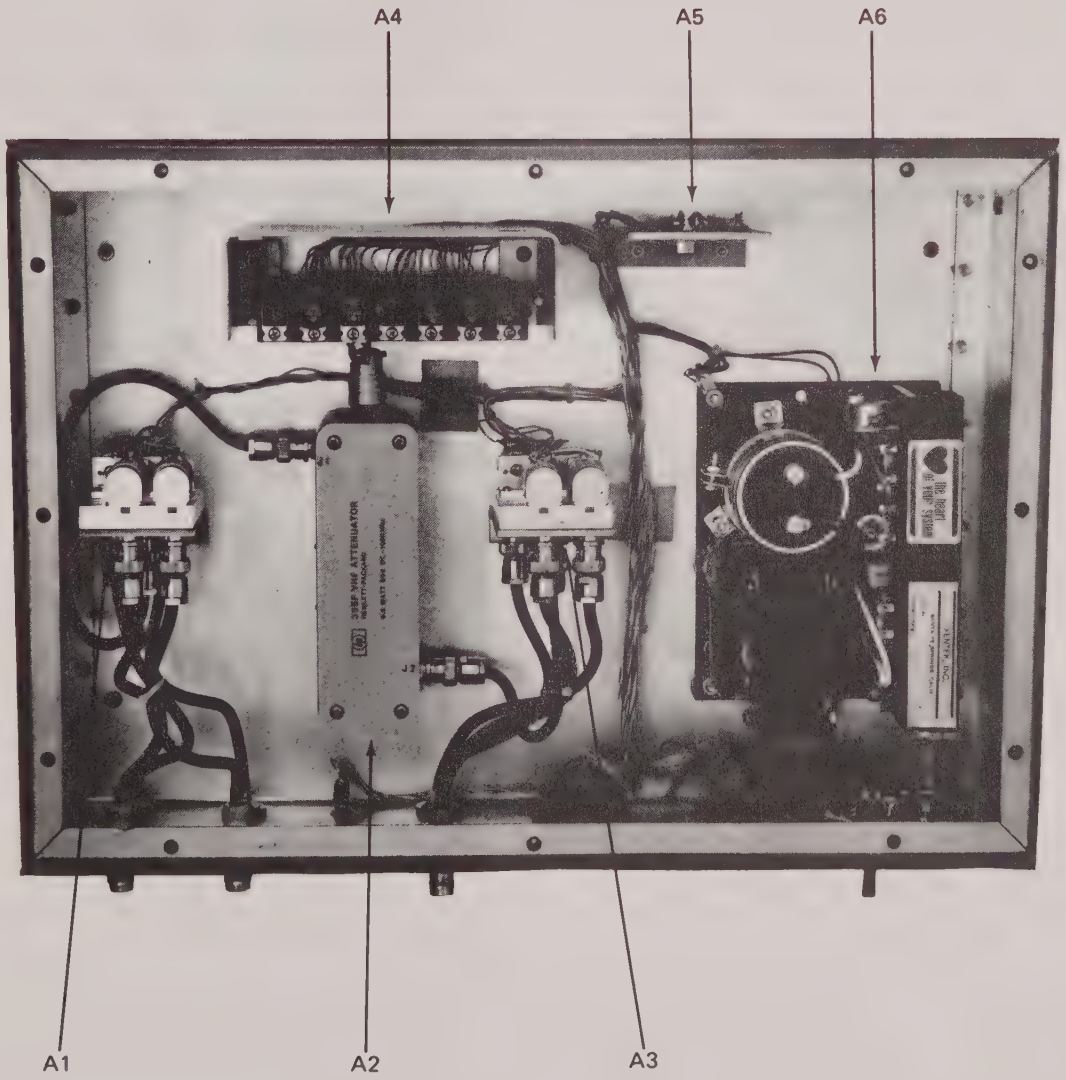


Figure 7-1. Assembly Location Diagram, Model IU-7A

7.4 FAULT ISOLATION PROCEDURE

a. Check for +11.5 V ±1.5 V (+10 V to +13 V) at A5U1-1.

b. Check for +5 V ±0.1 V (+4.9 V to +5.1 V) at A4-A.

c. Check for +24 V at A4-N.

d. Check for -15 V at A4-S.

e. Measure the current on the +5 V line with the clip-on milliameter. The indication should be 250 mA ±30 mA (220 mA to 280 mA).

f. Ground J9-M and measure the current on the +24 V line. The indication should be 900 mA ±100 mA (800 mA to 1000 mA).

g. With J9-M grounded and using the ac power meter, measure the power in the ac line. It should indicate 40 watts maximum.

Section VIII

REPLACEABLE PARTS

8.1 INTRODUCTION

This section contains information for ordering replacement parts. The Tables 8-1 thru 8-6 list the parts according to their functional groupings. Parts are listed in alpha-numerical order of their reference designators and indicate the description, the Singer part number, typical manufacturer of the part in a five-digit code, and the manufacturer's part number. Table 8-7 lists the typical manufacturers in numerical code number order.

Table 8-1. Parts List for Main Assemblies and Chassis, Model IU-7A

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
A1	Assembly, Coaxial Switch, 1 pole, 4 positions, Coil: 26 Vdc, 280 ohms	1-951048-001	13511	323-11506 -3
A2	Assembly, Step Attenuator, programmable, 0 dB to 120 dB in 10 dB steps	1-972005-001	28480	355F
A3	Assembly, Coaxial Switch, 1 pole, 4 positions, Coil: 26 Vdc, 280 ohms	1-951048-001	13511	323-11506 -3
A4	Assembly, Decoder/Driver	2-202293-001	88869	
A5	Assembly, Voltage Regulator	1-005062-001	88869	
A6	Assembly, Power Supply, 24 Vdc	1-968007-002	0000A	XE-30-24
DS1	Indicator lamp assembly, red lens, 10 V, 20 mA	1-925007-003	32539	L-10/20
F1	Fuse, slo-blo, 0.5 Amp, 250 V	1-924000-014	03614	MDL
F2	Fuse, slo-blo, 0.5 Amp, 250 V	1-924000-014	03614	MDL
J1	Part of W1			
J2	Part of W2			
J3	Part of W3			
J4	Part of W4			
J5	Part of W7			
J6	Part of W8			
J7	Part of W9			
J8	Connector, jack, mounting box, 41 pins	1-910202-007	71468	KPTM02 A20-41P

Table 8-1. Parts List for Main Assemblies and Chassis, Model IU-7A (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
J9	Connector, jack, mounting box, 19 pins	1-910202-004	71468	KPTM02 A14-19P
J10	Connector, jack, ac power, 3 pins	1-910165-001	82389	EAC-301
R1	Not used			
R2	Resistor, fixed, composition, 820 ohms, ±5%, 1/2 W	1-945001-160	01121	EB2815
S1	Switch, toggle, 2 poles, 2 positions	1-951012-001	73559	2BL6273
S2	Switch, slide, 2 poles, 2 positions	1-951029-001	82389	46256LF
S3	Switch, toggle, 1 pole, 2 positions	1-951036-001	09353	7101
W1	Cable assembly, consisting of:	2-004990-002	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-233/U
	(J1)Connector, jack, BNC	S-12096	13511	Mil Type UG-909/U
	Connector, plug, BNC	1-910160-001	14949	PL-24
W2	Cable assembly, consisting of:	2-004990-002	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J2)Connector, jack, BNC	S-12096	13511	Mil Type UG-909/U
	Connector, plug, BNC	1-910160-001	14949	PL-24
W3	Cable assembly, consisting of:	2-004990-003	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J3)Connector, jack, type N	1-910312-001	26805	3004-7141-10

Table 8-1. Parts List for Main Assemblies and Chassis, Model IU-7A (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
	Connector, plug, BNC	1-910160-001	14949	PL-24
W4	Cable assembly, consisting of:	2-004990-003	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J4) Connector, jack, type N	1-910312-001	26805	3004-7141-10
	Connector, plug, BNC	1-910160-001	14949	PL-24
W5	Cable assembly, consisting of:	2-004990-001	88869	
	Cable, coaxial, 12 in., RG-223/U	1-999014-016	04946	RG-223/U
	Connector, plug, BNC (2 required)	1-910160-001	14949	PL-24
W6	Cable assembly, consisting of:	2-004990-004	88869	
	Cable, coaxial, 7 in., RG-223/U	1-999014-016	04946	RG-223/U
	Connector, plug, BNC (2 required)	1-910160-001	14949	PL-24
W7	Cable assembly, consisting of:	2-004990-002	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J5) Connector, jack, BNC	S-12096	13511	Mil Type UG-909/U
	Connector, plug, BNC	1-910160-001	14949	PL-24
W8	Cable assembly, consisting of:	2-004990-002	88869	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J6) Connector, jack, BNC	S-12096	13511	Mil Type UG-909/U
	Connector, plug, BNC	1-910160-001	14949	PL-24

Table 8-1. Parts List for Main Assemblies and Chassis, Model IU-7A (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
W9	Cable assembly, consisting of:	2-004990-003	88888	
	Cable, coaxial, 8 in., RG-223/U	1-999014-016	04946	RG-223/U
	(J7)Connector, jack, type N	1-910312-001	26805	3004-7141-10
	Connector, plug, BNC	1-910160-001	14949	PL-24
XA1	Not Used			
XA2	Not Used			
XA3	Not Used			
XA4	Socket, printed circuit board, 34 socket	1-910311-001	04963	3434-0000
XF1	Fuseholder, 3AG	1-924007-001	75915	341001
XF2	Fuseholder, 3AG	1-924007-001	75915	341001

Table 8-2. Parts List for Miscellaneous Parts, Model IU-7A

Qty	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
4	Feet-bench mounting	1-964044-009	77969	9102-7

Table 8-3. Parts List for Supplied Accessories, Model IU-7A

Qty	Description	Singer Part/Model No.	Mfr. Code No.	Mfr. Part No.
1	Cable, ac power, 7 1/2 feet	1-910166-001	70903	KH7375
1	Instruction Manual	1-500783-283	88869	
1	Cable, control, 19 conductor, 20 feet	94604-2	88869	
2	Rack Mounting Brackets	2-103856-001	88869	
8	Screws, flathead, 8-32 x 3/8"	1-964064-043	88869	

Table 8-4. Parts List for Decoder/Driver Assembly, A4

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1	Capacitor, fixed, electrolytic, 22 μF, ±20 %, 6 Vdc	1-900057-025	56289	150D226 X0006B2
CR1	Not Used			
CR2	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR3	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR4	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR5	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR6	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR7	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR8	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
CR9	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR10	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR11	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR12	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR13	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR14	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
CR15	Diode, silicon, Vr=50 V, If=1 A	1-913001-001	04713	1N4001
Q1	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q2	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q3	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q4	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q5	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q6	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q7	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q8	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q9	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q10	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q11	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q12	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q13	Transistor, silicon, PNP	1-958097-001	01295	TIP30A

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
Q14	Transistor, silicon, PNP	1-958097-001	01295	TIP30A
Q15	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q16	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q17	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q18	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q19	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q20	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q21	Transistor, silicon, NPN	1-958056-001	01295	2N5449
Q22	Transistor, silicon, NPN	1-958056-001	01295	2N5449
R1	Resistor, fixed, composition 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R2	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R3	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R4	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R5	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R6	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R7	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R8	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R9	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R10	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R11	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R12	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R13	Resistor, fixed, composition, 2.2 kΩ, ±5%, 1/2 W	1-945001-170	01121	EB2225
R14	Resistor, fixed, composition, 1.8 kΩ, ±5%, 1/2 W	1-945001-168	01121	EB1825
R15	Resistor, fixed, composition, 2.2 kΩ, ±5%, 1/2 W	1-945001-170	01121	EB2225
R16	Resistor, fixed, composition, 1.2 kΩ, ±5%, 1/4 W	1-945000-164	01121	CB1225
R17	Resistor, fixed, composition, 1.2 kΩ, ±5%, 1/4 W	1-945000-164	01121	CB1225
R18	Resistor, fixed, composition, 1.2 kΩ, ±5%, 1/4 W	1-945000-164	01121	CB1225
R19	Resistor, fixed, composition, 1.2 kΩ, ±5%, 1/4 W	1-945000-164	01121	CB1225
R20	Resistor, fixed, composition, 1.2 kΩ, ±5%, 1/4 W	1-945000-164	01121	CB1225

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R21	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R22	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R23	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R24	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R25	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R26	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R27	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R28	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R29	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R30	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R31	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R32	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R33	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015

Table 8-4. Parts List for Decoder/ Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R34	Resistor, fixed, composition, 100Ω, ±5%, 1/4 W	1-945000-138	01121	CB1015
R35	Resistor, fixed, composition, 2.4 kΩ, ±5%, 1/4 W	1-945000-171	01121	CB2425
R36	Resistor, fixed, composition, 2.4 kΩ, ±5%, 1/4 W	1-945000-171	01121	CB2425
R37	Resistor, fixed, composition, 2.4 kΩ, ±5%, 1/4 W	1-945000-171	01121	CB2425
R38	Resistor, fixed, composition, 2.4 kΩ, ±5%, 1/4 W	1-945000-171	01121	CB2425
R39	Resistor, fixed, composition, 2.4 kΩ, ±5%, 1/4 W	1-945000-171	01121	CB2425
R40	Not Used			
R41	Not Used			
R42	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R43	Resistor, fixed, composition. 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R44	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R45	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R46	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R47	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R48	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R49	Resistor, fixed, composition, 22 kΩ, ±5%, 1/4 W	1-945000-194	01121	CB2235
R50	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R51	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R52	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R53	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R54	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R55	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R56	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
R57	Resistor, fixed, composition, 1 kΩ, ±5%, 1/4 W	1-945000-162	01121	CB1025
U1	Integrated circuit, hex inverter	1-926007-027	01295	SN7404N
U2	Integrated circuit, quad gates, 2 input, positive NAND	1-926007-001	01295	SN7400N
U3	Integrated circuit, decoder, BCD to decimal	1-926007-037	01295	SN7445N

Table 8-4. Parts List for Decoder/Driver Assembly, A4 (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
U4	Integrated circuit, decoder, BCD to decimal	1-926007-037	01295	SN7445N
U5	Integrated circuit, hex buffer/driver, open collector high voltage outputs	1-926007-029	01295	SN7407N
XU1	Socket, integrated circuit, dual in line, 14 pins	1-950014-001	91506	314AG5 D2R
XU2	Socket, integrated circuit, dual in line, 14 pins	1-950014-001	91506	314AG5 D2R
XU3	Socket, integrated circuit, dual in line, 16 pins	1-950015-001	91506	316AG5 D2R
XU4	Socket, integrated circuit, dual in line, 16 pins	1-950015-001	91506	316AG5 D2R
XU5	Socket, integrated circuit, dual in line, 14 pins	1-950014-001	91506	314AG5 D2R

Table 8-5. Parts List for Voltage Regulator Assembly, A5

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1	Capacitor, fixed, electrolytic, 10 μF, ±10 %, 20 Vdc	1-900057-119	56289	150D106 X9020B2
C2	Capacitor, fixed, electrolytic, 10 μF, ±10%, 20 Vdc	1-900057-119	56289	150D106 X9020B2
R1	Resistor, fixed, wirewound, 50 Ω, ±1%, 12.5 W	1-945080-103	91637	RH1050 R0-1%
U1	Integrated circuit, voltage regulator	1-926038-002	27014	LM-309K

Table 8-6. Parts List for Power Supply Assembly, A6 (Purchased assembly)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
C1	Capacitor, fixed, electrolytic, 7100 μF, 50 Vdc		0000A	
C2	Capacitor, fixed, electrolytic, 500 μF, 25 Vdc	1-900024-002	0000A	
C3	Capacitor, fixed, electrolytic, selected		0000A	
C4	Capacitor, fixed, electrolytic, 0.001 μF, 50 Vdc		0000A	
C5	Capacitor, fixed, electrolytic, 0.001 μF, 50 V		0000A	
CR1	Diode, silicon, Vr=100 V, If=240 mA		0000A	1N1200A
CR2	Diode, silicon, Vr=100 V, If=240 mA		0000A	1N1200A
Q1	Transistor, silicon, PNP		0000A	2N2905A
Q2	Transistor, silicon, NPN		0000A	2N3055
Q3	Transistor, silicon, NPN		0000A	2N3055
R1	Resistor, fixed, composition, 100 Ω, ±10%, 1/2 W	1-945001-025	0000A	
R2	Resistor, fixed, composition, 10 Ω, ±10%, 1/2 W	1-945001-013	0000A	
R3	Resistor, fixed, composition, 82 Ω, ±10 %, 1/2 W	1-945001-024	0000A	
R4	Resistor, fixed, composition, 100 Ω, ±10 %, 1/2 W	1-945001-025	0000A	
R5	Resistor, fixed, composition, 1.8 k Ω, ±10%, 1/2 W	1-945001-040	0000A	

Table 8-6. Parts List for Power Supply Assembly, A6 (Purchased assembly) (Cont.)

Ref. Design.	Description	Singer Part No.	Mfr. Code No.	Mfr. Part No.
R6	Resistor, fixed, composition, 100 Ω, ±10%, 1/2 W	1-945001-025	0000A	
R7	Resistor, variable, composition, 2.5 kΩ, ±10%, 1/2 W		0000A	
R8	Resistor, fixed, composition, 33 kΩ, ±10%, 1/2 W	1-945001-055	0000A	
R9	Resistor, fixed, composition, 3.3 kΩ, ±10%, 1/2 W	1-945001-043	0000A	
R10	Resistor, fixed, wirewound, 0.22 Ω, ±10 %, 5 W		0000A	
T1	Transformer, 120 V/ 240 V primary		0000A	
U1	Integrated circuit		0000A	LM305A

Table 8-7. Code List of Manufacturers

Mfr. Code No.	Manufacturer	Address
0000A*	Xentek, Inc.	Santa Fe Springs, Ca.
01121	Allen-Bradley Co.	Milwaukee, Wisc.
01295	Texas Instruments, Inc.	Dallas, Tex.
03508	GE Semiconductor Prod. Div.	Syracuse, N. Y.
03614	Bussmann Mfg.	Los Angeles, Ca.
04713	Motorola, Inc.	Phoenix, Ariz.

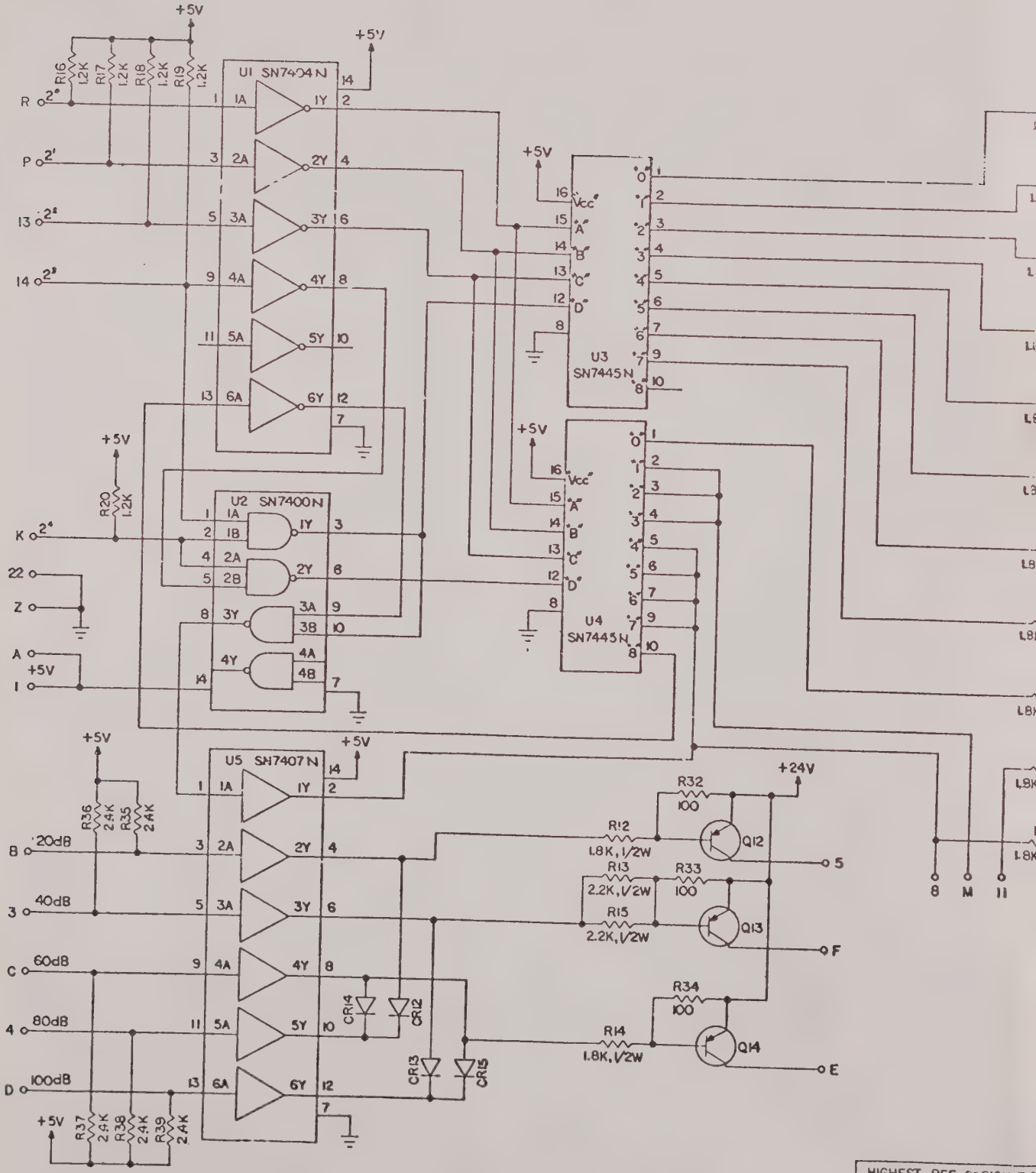
*This vendor has no listing in the latest supplement to the Federal Supply Code for Manufacturer's Cataloging Handbook H4-1.

Table 8-7. Code List of Manufacturers (Cont.)

Mfr. Code No.	Manufacturer	Address
04946	Standard Wire and Cable Co.	Los Angeles, Ca.
04963	Minnesota Mining and Mfg. Co.	St. Paul, Minn.
09353	C&K Components, Inc.	Newton, Mass.
13511	Amphenol Corp., Connector Div.	Los Gatos, Ca.
14949	Trompeter Electronics, Inc.	Chatsworth, Ca.
26805	American Microwave Industries, Inc.	Waltham, Maine
27014	National Semiconductor Corp.	Santa Clara, Ca.
28480	Hewlett-Packard	Palo Alto, Ca.
32539	Mura Corp.	Jerico, N. Y.
56289	Sprague Electric Co.	North Adams, Mass.
70903	Belden Mfg. Co.	Chicago, Ill.
71468	ITT Cannon Electric	Santa Ana, Ca.
73559	Carling Electric Inc.	Hartford, Conn.
75915	Littelfuse, Inc.	Des Plaines, Ill.
77969	Rubbercraft Corp. of Calif.	Torrance, Ca.
82389	Switchcraft	Chicago, Ill.
88869	Singer Instrumentation	Los Angeles, Ca.
91506	Augat, Inc.	Attleboro, Mass.
91637	Dale Electronics, Inc.	Columbus, Neb.

Section IX

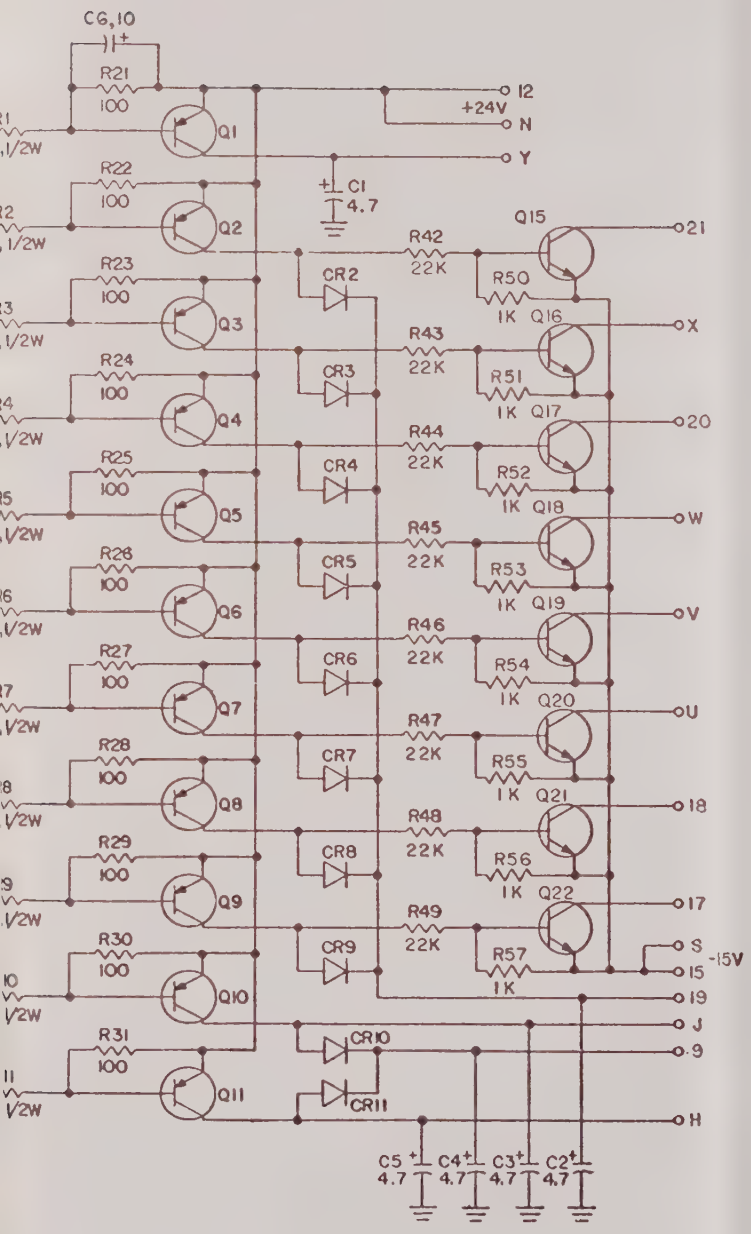
SCHEMATIC DIAGRAMS

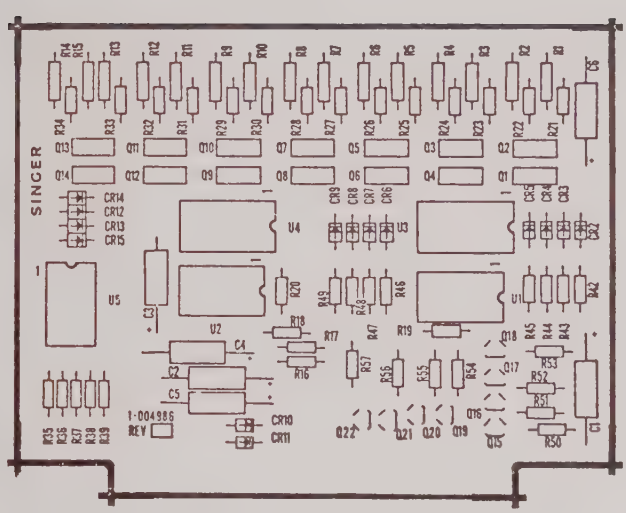


HIGHEST REF DESIGNATIO					
R57	CR15	C22	U5	C3	
REF DESIGNATIONS NOT					
R40,41	CR1				

5. TRANSISTORS Q15 THRU Q22 ARE 2N5449.
4. TRANSISTORS Q1 THRU Q14 ARE TIP30A.
3. ALL CAPACITORS ARE IN MICROFARADS.
2. ALL DIODES ARE IN4001.
1. ALL RESISTORS ARE IN OHMS, 5%, 1/4W.

NOTES: UNLESS OTHERWISE SPECIFIED





NS USED
ISED

Figure 9-1. Schematic Diagram, Decoder/Driver Assembly, A4

Dwg. No. 4-501422-001 (A)

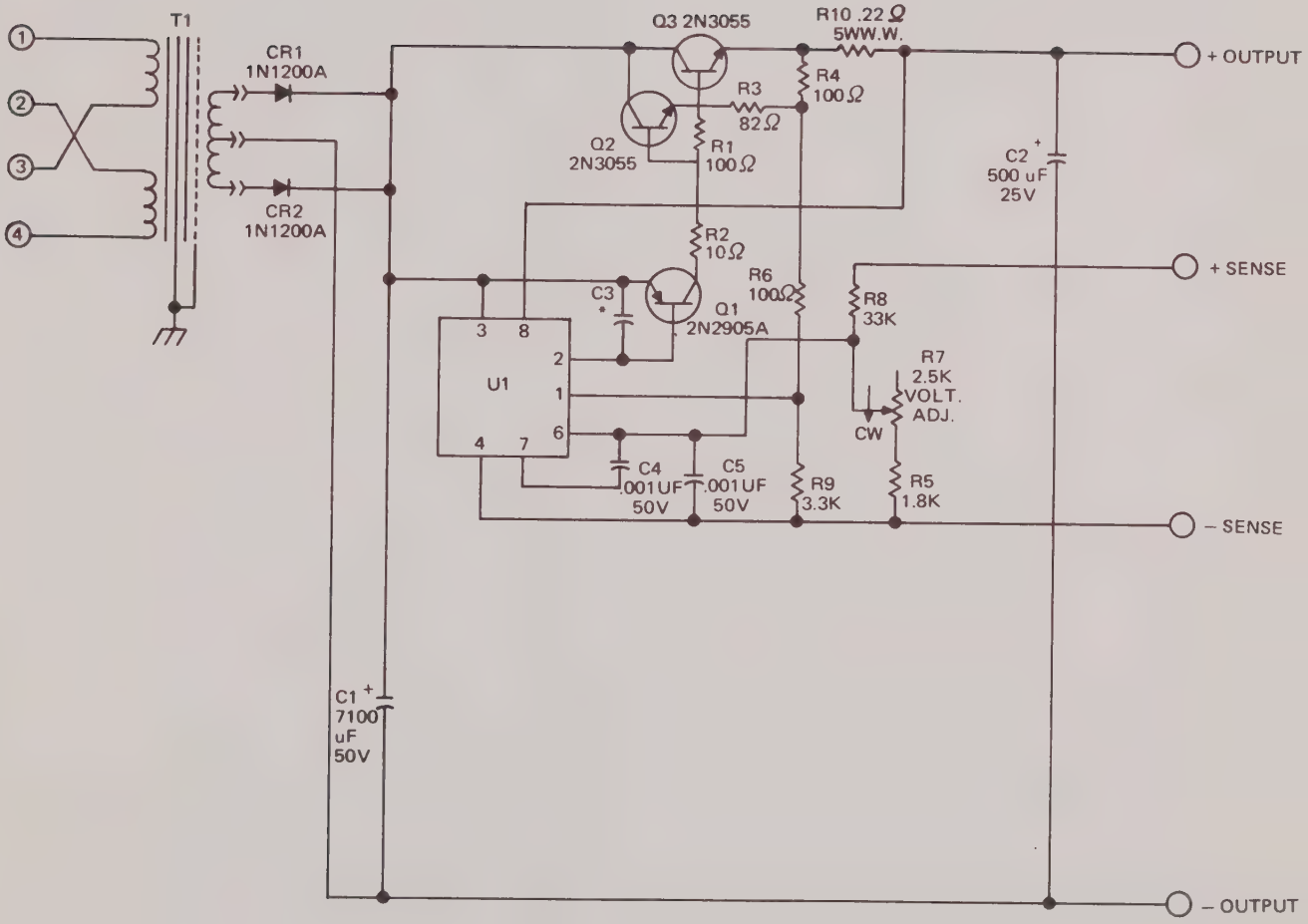
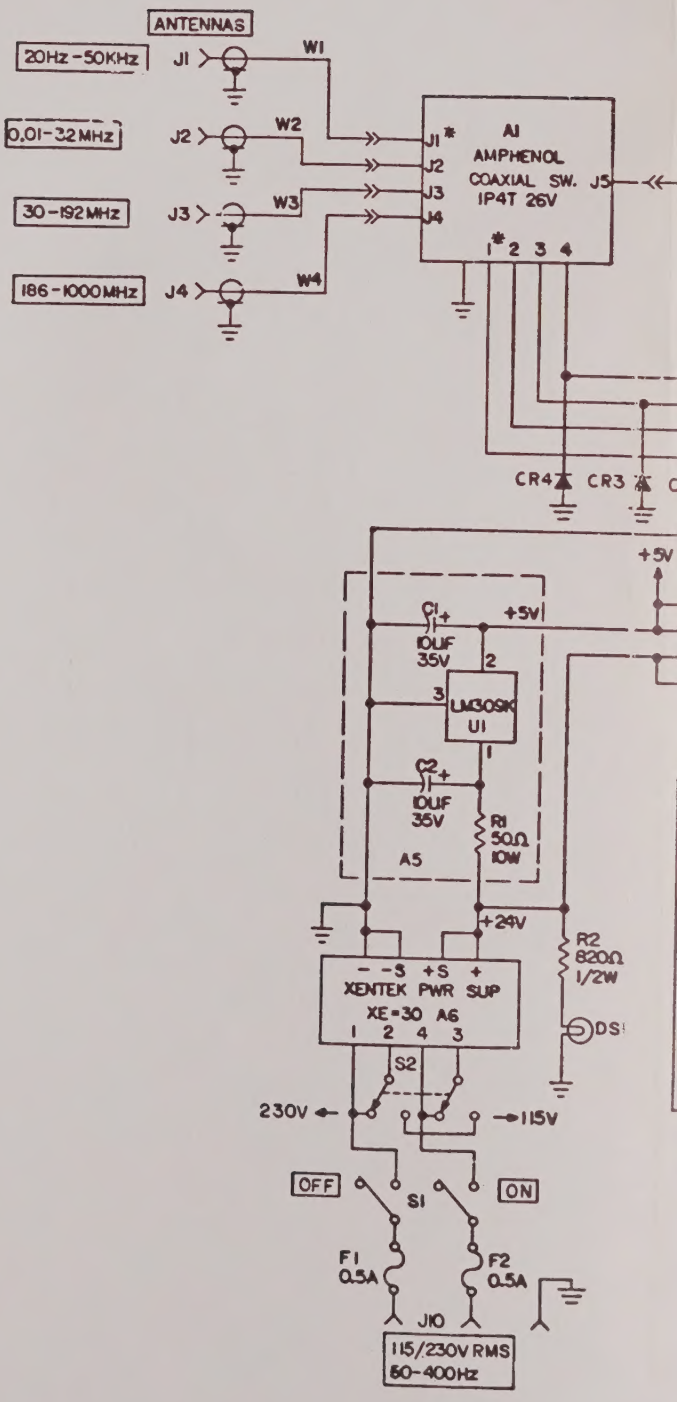


Figure 9-2. Schematic Diagram, Power Supply Assembly, A6

2. *indicates a selected value
1. All resistors are 1/2 W, ±10%

Notes: Unless otherwise specified.



2. CR1 THRU CR6 ARE IN4001.

1. * CONTROL LINES 1 THRU 4 OPERATE CORRESPONDING PORTS 1 THRU 4 OF A1 AND A3 PORTS AND CORRESPONDING CONTROL LINES ARE SELECTED FOR BEST VSWR DURING TEST.

NOTES: UNLESS OTHERWISE SPECIFIED

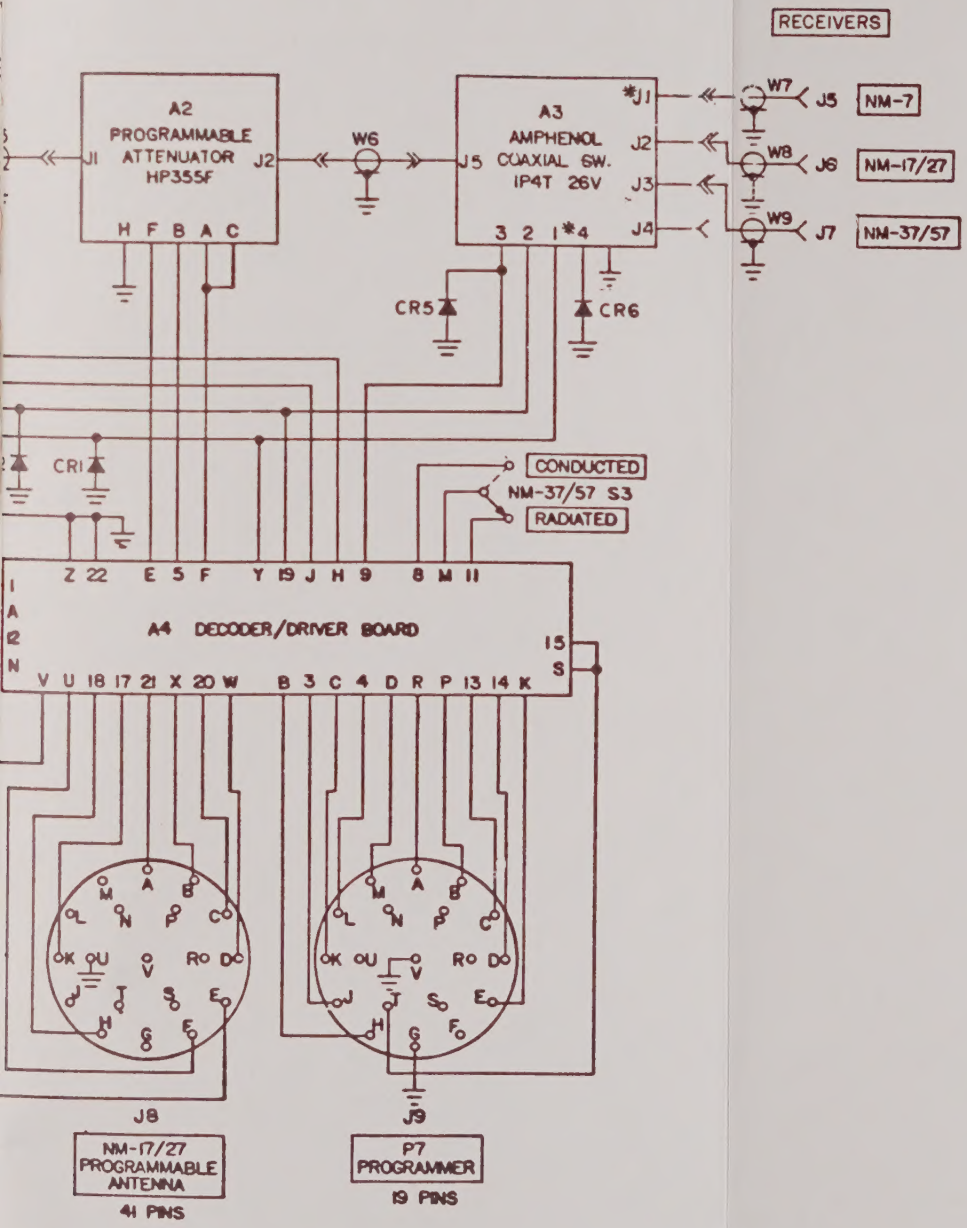


Figure 9-3. Wiring Diagram, Model IU-7A

Dwg. No. 4-501423-001 (A)

MP MASTER
MA24026